

Study of the discharge phase of a hybridized thermocline thermal energy storage system with a nano-enhanced phase change material

Daniele Nicolini

Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA),
Casaccia Research Center - Via Anguillarese, 301 – 00123 Rome, Italy

daniele.nicolini@enea.it

Thermal energy storage (TES) systems that are commercially mature today are divided into two main categories: sensible heat systems and latent heat systems. Among the former, thermocline systems are of great importance. In this work we studied, through CFD simulations, the improvement of the behaviour in the discharge phase of a thermocline TES system, inserting inside the storage tank of a zone containing a phase change material (PCM), and thus realizing a hybrid TES (sensible and latent heat). Two different PCM were considered: the first consisting of 'solar salt' and the second consisting of nano-enhanced PCM, that is 'solar salt' nano-charged through the dispersion inside of a metalorganic framework.